Google

audio and watermark	Search	Advanced Search
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The "AND" operator is unnecessary -- we include all search terms by default. [details]

Web   Results 1 - 10 of about **2,140,000** for <u>audio</u> and <u>watermark</u>. (0.24 seconds)

Activated Content
Using **audio watermarking** to enable progressive business models for the ... and practical
watermarking solution for encoding identifiable, robust, ...
www.activatedcontent.com/ - 8k - Cached - Similar pages

Microsoft **Audio Watermarking** Tool
Spread Spectrum **Watermarking** of **Audio** Signals. IEEE Transactions on Signal
Processing, Vol.51, (no.4), pp.1020–33, 2003. As mentioned in the publication, ...
research.microsoft.com/research/downloads/Details/885bb5c4-ae6d-418b-97f9-
adc9da8d48bd/Details.aspx - 16k - Cached - Similar pages

audio watermark Definition
audio watermark Definition. ... A **watermark** embedded within an **audio** stream to identify
its origination. See digital **watermark**. RELATED TERMS: ...
www.pcmag.com/encyclopedia_term/0,2542,t=audio+watermark&i=38175,00.asp - 63k -
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SysCoP - **audio**
In comparison there exist only a few **audio watermarking** methods. ... A typical **audio**
watermark encoder consists of several components (illustrated in Figure ...
www.igd.fraunhofer.de/igd-a8/syscop/**audio**.html - 11k - Cached - Similar pages

New **audio** "watermark" copy protection scheme for cinemas in the ...
Well not for long... the movie industry just unveiled a system at their DVD Forum in Paris
last week that would embed an **audio** "**watermark**" during the ...
www.engadget.com/2005/11/02/new-**audio-watermark**-copy-protection-scheme-for-
cinemas-in-the/ - 91k - Cached - Similar pages

MySpace.com - **WATERMARK AUDIO** - 100 - Male - HOUSTON, TEXAS - www ...
MySpace profile for **WATERMARK AUDIO** with pictures, videos, personal blog, interests,
information about me and more.
www.myspace.com/**watermarkaudio** - 105k - Cached - Similar pages

Watermark Embedding for **Audio** Signals
MusicTrace provides broadcast monitoring and Internet tracing for music and advertising
spots based on **audio watermarking** and fingerprinting technology.
www.musictrace.de/products/contentmark.en.htm - 21k - Cached - Similar pages

AudioRevolution.com Breaking News DVD **Audio Watermarking** Fiasco
AudioRevolution.com news about the DVD **Watermarking** fiasco.
www.avrev.com/news/0800/09.dvd**watermark**.shtml - 18k - Cached - Similar pages

metois.com
metois.com.
xenia.media.mit.edu/~metois/Projects/Waterm/waterm.htm - 1k - Cached - Similar pages

Digital **Audio Watermarking**
Digital **audio watermarking** involves the concealment of data within a discrete **audio** file.

Applications for this technology are numerous. ...
www.ece.uvic.ca/~ece499/2003a/group09/w/**watermark**ing.htm - 27k -
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The **"AND"** operator is unnecessary -- we include all search terms by default. [details]

Web   Results **11 - 20** of about **2,140,000** for <u>audio</u> and <u>watermark</u>. (0.26 seconds)

Audio-signal watermarking in 3-D space based on virtual-optics
Audio-signal **watermark**, 3-D space, virtual optical imaging, digital Fresnel diffraction. DOI:,
10.1078/0030-4026-00295. Bibliographic Code: **...**
adsabs.harvard.edu/abs/2003Optik.114..451P - Similar pages

Microsoft patents digital audio DRM watermark News - PC Advisor
Microsoft has won a patent for a digital-**watermarking** technology. The Microsoft
watermarking technology - "stealthy **audio watermarking**" - could be used to **...**
www.pcadvisor.co.uk/news/index.cfm?newsid=10696 - 41k - Cached - Similar pages

A new content-based digital audio watermarking algorithm for ...
Our **audio**-dependent **watermarking** procedure directly exploits temporal and frequency **...**
Digital **audio watermarking** technique: Retrospect and Prospect. **...**
portal.acm.org/citation.cfm?id=1046290.1046304 - Similar pages

Adaptive Signal-Dependent Audio Watermarking Based on Human ...
niques is that they fail to extract **audio watermarks** from. **watermarked audio** [16, 21]. **.....**
is to obtain a function that maps a **watermarked audio** to **...**
www.springerlink.com/index/F768TN141521M827.pdf - Similar pages

Audio electronic watermarking device - Patent 20060052887
The present invention relates to an **audio** digital **watermark** apparatus in which noise is not
generated by embedding **watermark** data, which is resistant to **...**
www.freepatentsonline.com/20060052887.html - 100k - Cached - Similar pages

[Paper] A Novel Audio Digital Watermarking Algorithm based on U ...
KEY WORDS U System, orthogonal function system, **audio watermarking**, robust
watermark. 1. Introduction Owing to the popularity of Internet commerce, **...**
www.actapress.com/PDFViewer.aspx?paperId=31788 - Similar pages

[Paper] Audio Watermarking based on Pitch Scaling
AUDIO WATERMARKING BASED ON PITCH SCALING Seungwon Shin1 , Jongweon
Kim2 and Jonguk Choi12 1 MarkAny Research Institute, 100-400 151-11, Ssanglim bldg. **...**
www.actapress.com/PDFViewer.aspx?paperId=17018 - Similar pages
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Audio Digital watermark Algorithm Based M-Sequence Modulation
watermark. technology. The. most. iinpom cllaracterisiic of **audio ... watermark**. infonmtion.
in. dle. smple data of **audio** signal wide. transform. donlain **...**
ieeexplore.ieee.org/iel5/9834/30995/01442264.pdf - Similar pages

Anti-Cropping Synchronization Audio Digital Watermark
A new blind digital **audio watermarking** scheme is. presented in this paper. **...** the
watermark cannot be recovered while the **audio** is. suffered from cropping. **...**
ieeexplore.ieee.org/iel5/4128765/4129618/04129658.pdf?
isnumber=4129618&prod=CNF&arnumber=4129658... - Similar pages

Public Audio Watermark Homepage

where x(n) and y(n) are samples of the original and the **watermarked audio** clips,
respectively. The SNR values in the brackets of Table 1 is calculated based ...
www.cmlab.csie.ntu.edu.tw/~dynamic/AWM/index.html - 27k - Cached - Similar pages

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The **"AND"** operator is unnecessary -- we include all search terms by default. [details]

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Watermark Embedding for Audio Signals
ContentMarkMP3 is a product for embedding **watermarks** in existing **MP3** audio files. The
format is not changed by the **watermark**, consequently the **MP3** audio ...
www.musictrace.de/products/contentmark.en.htm - 21k - Cached - Similar pages

PC World - MP3 Inventor Develops Tool to Fight Piracy
The system lets content providers, such as music studios, embed a **watermark** in their
downloadable **MP3** files. **Watermark** technology makes slight changes to ...
www.pcworld.com/news/article/0,aid,124676,00.asp - 53k - Cached - Similar pages

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Watermark. ... Email:, Password:, login. Signup for a free **mp3** account | Forgot Login |
Help ... Album Results for "**Watermark**" ...
www.mp3.com/search.php?action=Search&stype=album&query=Watermark - 26k -
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Mind Booster Noori: Amazon Watermarking mp3's?
Yesterday some people started a buzz around some Amazon **mp3's** being "**watermarked**".
Now, please, calm down: I know that talking about **watermarked** songs might ...
mindboosternoori.blogspot.com/2007/09/amazon-**watermark**ing-mp3s.html - 86k -
Cached - Similar pages

Labels Could Sell Watermarked MP3s | Listening Post from Wired.com
Looking at the list of member companies, a blurry picture begins to emerge of what a digital
music market for **watermarked MP3** music might look like (in ...
blog.wired.com/music/2006/12/labels_could_se.html - 69k - Cached - Similar pages

CNN - MP3: Web music giants form digital watermark coalition ...
On Monday morning, Liquid Audio, **MP3**, CDnow and a collection of record labels and other
companies announced they were forming a coalition to **watermark** ...
tarpbg.com/TECH/computing/9901/27/**mp3**.idg/index.html - 30k - Cached - Similar pages

[WM]: [WM] MP3 watermarking
Dear all, I'm new to **watermarking** and I am currently working on **watermarking** for **MP3**
files. I would like to ask if it is possible to do **watermarking** on **MP3** ...
www.**watermark**ingworld.org/WMMLArchive/0409/msg00041.html - 13k -
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[PPT] Digital Watermarking
File Format: Microsoft Powerpoint - View as HTML
Dave's **mp3** turns out to be **watermarked** only for his use; Joe's **mp3** player rejects Dave's
NSync **mp3** because it detects the **mp3 watermark** registered to Dave ...
www.cs.virginia.edu/~evans/cs588-fall2001/projects/presentations/team10.ppt -

The Seattle Times: Brier Dudley's blog
Amazon's **MP3** store, **watermarks** and fair use. Posted by Brier Dudley at 12:14 PM. I'm not
the only one on a fair use jag today. ...
blog.seattletimes.nwsource.com/brierdudley/
2007/10/amazons_**mp3**_store_**watermark**s_a.html - 42k - <u>Cached</u> - <u>Similar pages</u>

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1 Benchmarking and attacks: Transparency and complexity benchmarking of audio watermarking algorithms issues
Andreas Lang, Jana Dittmann
September 2006 **Proceeding of the 8th workshop on Multimedia and security MM&Sec '06**
Publisher: ACM Press
Full text available: 🔒 pdf(336.26 KB)   Additional Information: full citation, abstract, references, index terms

A wide range of watermarking evaluation techniques especially for robustness has been described in the literature. Our paper sets the main focus on the evaluation of transparency and complexity of the embedding function of digital audio watermarking algorithms. Here, beside the evaluation of embedding parameters and the impact of audio content are investigated to determine the effects of transparency and complexity. The five selected watermarking algorithms, working in different domains, the emb ...

Keywords: audio, benchmarking, evaluation, watermarking

2 Audio: Audio watermark attacks: from single to profile attacks
Andreas Lang, Jana Dittmann, Ryan Spring, Claus Vielhauer
August 2005 **Proceedings of the 7th workshop on Multimedia and security MM&Sec '05**
Publisher: ACM Press
Full text available: 🔒 pdf(224.98 KB)   Additional Information: full citation, abstract, references, index terms

A wide range of watermarking evaluation approaches and especially image benchmarking suites have been described in the literature. Our paper sets the main focus on the evaluation of digital audio watermarking with StirMark Benchmark for Audio (SMBA). Here we describe the currently implemented single geometric attacks in detail and introduce our so-called attack profiles. Profiles reflect an application oriented point of view ranging from the normal usage of audio content like internet radio or m ...

Keywords: attack, audio, digital watermarking, smba, stirmark

3 Biometrics, watermarking, IKE: A new content-based digital audio watermarking algorithm for copyright protection
Xiang-yang Wang, Yong-rui Cui, Hong-ying Yang, Hong Zhao

November 2004 **Proceedings of the 3rd international conference on Information security InfoSecu '04**
Publisher: ACM Press
Full text available: 📄 pdf(563.54 KB)   Additional Information: full citation, abstract, references, index terms

Digital audio watermarking embeds inaudible information into digital audio data for the purposes of copyright protection, ownership verification, convert communication, and/or auxiliary data carrying. In this paper, we present a novel watermarking scheme to embed a meaningful gray image into digital audio by quantizing the wavelet coefficients (using integer lifting wavelet transform) of audio samples. Our audio-dependent watermarking procedure directly exploits temporal and frequency perceptual ...

Keywords: digital audio, digital watermarking, human auditory system, integer lifting wavelet transform, quantization

4 Digital watermarking approaches I: A compressed-domain watermarking algorithm for mpeg audio layer 3
D. K. Koukopoulos, Y. C. Stamatiou
October 2001 **Proceedings of the 2001 workshop on Multimedia and security: new challenges MM&Sec '01**
Publisher: ACM Press
Full text available: 📄 pdf(483.56 KB)   Additional Information: full citation, abstract, references

In this work, we present a digital watermarking scheme for mpeg audio layer 3 audio files that operates directly in the compressed data while manipulating the time and subband/channel domain. In addition, it does not need the original signal to detect the watermark. Our scheme overcomes the disadvantage of algorithms operating in the PCM-Data domain to be vulnerable to compression/recompression attacks, as it places the watermark in the scale factors domain and not in the digitized sound audi ...

Keywords: NP-completeness, audio watermarking, hard instances, mpeg audio layer 3, threshold phenomena

5 Audio: An SVD-based audio watermarking technique
Hamza Özer, Bülent Sankur, Nasir Memon
August 2005 **Proceedings of the 7th workshop on Multimedia and security MM&Sec '05**
Publisher: ACM Press
Full text available: 📄 pdf(283.33 KB)   Additional Information: full citation, abstract, references, citings, index terms

We present a non-oblivious, extremely robust watermarking scheme for audio signals. The watermarking algorithm is based on the SVD of the spectrogram of the signal. The SVD of the spectrogram is modified adaptively according to the information to be watermarked. The algorithm is tested for inaudibility performance with audio quality measures and robustness tests with audio Stirmark benchmark tool, which have a variety of common signal processing distortions. The comparison with a DCT based non-o ...

Keywords: singular value decomposition, watermarking

6 Posters and Short Papers: Digital audio watermarking based-on multiple-bit hopping and human auditory system
Changsheng Xu, Yongwei Zhu, David Dagan Feng
October 2001 **Proceedings of the ninth ACM international conference on Multimedia**

MULTIMEDIA '01
Publisher: ACM Press
Full text available: 📄 pdf(613.16 KB)   Additional Information: <u>full citation</u>, <u>abstract</u>, <u>references</u>, <u>index terms</u>

A novel content-adaptive audio watermarking technique is proposed. To optimally balance in-audibility and robustness when embedding and extracting watermarks, the embedding scheme is high related to audio content by making use of the properties of human auditory system and multiple-bit hopping technique. The experimental results in robustness are provided to support all the novel features in our watermarking scheme.

Keywords: audio, digital watermarking, human auditory system

7 <u>Watermarking algorithms: Informed detection of audio watermark for resolving playback speed modifications</u>
Sylvain Beauget, Michiel van der Veen, Aweke Lemma
September 2004 **Proceedings of the 2004 workshop on Multimedia and security MM&Sec '04**
Publisher: ACM Press
Full text available: 📄 pdf(388.24 KB)   Additional Information: <u>full citation</u>, <u>abstract</u>, <u>references</u>

In this paper, we present a method for informed watermark detection in audio signals. In this context, informed detection refers to the mechanism in which the original media signal is used to improve robustness and/or complexity. Here, we focused on reducing complexity by addressing the geometrical distortion problem. In audio, geometrical distortion translates to time scaling. Generally, s speed changes of the audio signals necessitate a mechanism in the detector to retrieve the watermark. Usua ...

Keywords: audio, fingerprinting, informed detector, music distribution, watermarking

8 <u>Robust digital watermarking: An audio watermarking scheme robust against stereo attacks</u>
David Megías, J. Herrera-Joancomartí, Julià Minguillón
September 2004 **Proceedings of the 2004 workshop on Multimedia and security MM&Sec '04**
Publisher: ACM Press
Full text available: 📄 pdf(191.73 KB)   Additional Information: <u>full citation</u>, <u>abstract</u>, <u>references</u>, <u>index terms</u>

In this paper, a watermarking scheme for both monophonic and stereophonic audio files is presented. The suggested method uses MPEG 1 Layer 3 compression to determine where and how the embedded mark must be introduced, combined with an error correcting code and a majority voting scheme. The scheme is shown to achieve high robustness against malicious attacks while maintaining a reasonable imperceptibility. The mark is embedded by modifying the magnitude of the spectrum at certain frequencies whic ...

Keywords: audio watermarking, copyright protection, frequency domain methods

9 <u>Watermarking: Statistical audio watermarking algorithm based on perceptual analysis</u>
Xiaomei Quan, Hongbin Zhang
November 2005 **Proceedings of the 5th ACM workshop on Digital rights management DRM '05**
Publisher: ACM Press
Full text available: 📄 pdf(261.76 KB)   Additional Information: <u>full citation</u>, <u>abstract</u>, <u>references</u>, <u>index terms</u>

In this paper, we describe a novel statistical audio watermarking scheme. Under the

control of the masking thresholds, watermark is embedded adaptively and transparently in the perceptual significant portions in wavelet packet domain by a statistical method. Watermark detection can be done without access to the original signal. Experimental results show the proposed scheme can survive common signal manipulations and malicious attacks.

Keywords: audio watermarking, psychoacoustic model, wavelet packet decomposition

10 Audio watermarking for monitoring and copy protection
Jaap Haitsma, Michiel van der Veen, Ton Kalker, Fons Bruekers
November 2000 **Proceedings of the 2000 ACM workshops on Multimedia MULTIMEDIA '00**
Publisher: ACM Press

Full text available: pdf(313.49 KB)   Additional Information: full citation, abstract, references, citings, index terms

Based on existing technology used in image and video watermarking, we have developed a robust audio watermarking technique. The embedding algorithm operates in frequency domain, where the magnitudes of the Fourier coefficients are slightly modified. In the temporal domain, an additional scale parameter and gain function are necessary to refine the watermark and achieve perceptual transparency. Watermark detection relies on the Symmetrical Phase Only Matched Filtering (SPOMF) cross-correlation ...

Keywords: audio, broadcast monitoring, copy protection, watermark detection, watermark embedding

11 Applications I: PlataJanus: an audio annotation watermarking framework
Jana Dittmann, Martin Steinebach
October 2001 **Proceedings of the 2001 workshop on Multimedia and security: new challenges MM&Sec '01**
Publisher: ACM Press
Full text available: pdf(545.27 KB)   Additional Information: full citation, abstract, references, index terms

The focus of audio watermarking research in recent years have been copyright protection and copy control mechanisms. Therefore the robustness and security of audio watermarks have been the most frequently discussed parameters. Transparency, payload and complexity have also been important, but most research has focused on the first two parameters. In this paper, we introduce an alternative watermarking application. PlataJanus is a system for displaying and reacting on digital annotation waterm ...

Keywords: annotation, audio watermarking, business models, framework

12 Applications I: Estimation of recording location using audio watermarking
Yuta Nakashima, Ryuki Tachibana, Masafumi Nishimura, Noboru Babaguchi
September 2006 **Proceeding of the 8th workshop on Multimedia and security MM&Sec '06**
Publisher: ACM Press
Full text available: pdf(209.98 KB)   Additional Information: full citation, abstract, references, index terms

In this paper, we propose a novel application of audio watermarking, estimation of recording location. The purpose of the paper is to determine the seat location in a theater at which a bootleg recording was made by using a digital video camera. In the proposed application, we embed different watermarks in the channels of the multi-channel sound of the movie. The multi-channel sound enters the air from multiple loudspeakers in a

theater. If a monaural recording of the sound is made, the location ...

Keywords: bootleg, digital audio watermarking, estimation, recording location

13 Authentication II: Audio watermarking algorithm for real-time speech integrity and authentication
Song Yuan, Sorin A. Huss
September 2004 **Proceedings of the 2004 workshop on Multimedia and security MM&Sec '04**
Publisher: ACM Press
Full text available: pdf(259.52 KB)   Additional Information: full citation, abstract, references, index terms

Data integrity and source origin authentication are essential topics for real-time multimedia systems. But traditional method, such as MAC, is not very applicable to overcome the distortion introduced in real-time multimedia communication. In this paper a new integrity mechanics deploying speech watermarking is presented. The advocated approach adopts public key encryption to efficiently generate non-repudiate speech. In the last part of the article, a speech watermarking algorithm incorporating ...

Keywords: integrity and source origin authentication, real-time multimedia communication and internet telephony, speech watermarking

14 Watermarking: Improved watermark detection for spread-spectrum based watermarking using independent component analysis
Hafiz Malik, Ashfaq Khokhar, Rashid Ansari
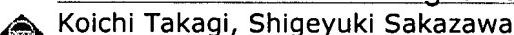November 2005 **Proceedings of the 5th ACM workshop on Digital rights management DRM '05**
Publisher: ACM Press
Full text available: pdf(434.70 KB)   Additional Information: full citation, abstract, references, index terms

This paper presents an efficient blind watermark detection/decoding scheme for spread spectrum (SS) based watermarking, exploiting the fact that in SS-based embedding schemes the embedded watermark and the host signal are mutually independent and obey non-Gaussian distribution. The proposed scheme employs the theory of independent component analysis (ICA) and posed the watermark detection as a blind source separation problem. The proposed ICA-based blind detection/decoding scheme has been simula ...

Keywords: blind source separation, correlation, detection, independent component analysis, spread spectrum, watermarking

15 Poster 3: content track: Light weight MP3 watermarking method for mobile terminals
Koichi Takagi, Shigeyuki Sakazawa
November 2005 **Proceedings of the 13th annual ACM international conference on Multimedia MULTIMEDIA '05**
Publisher: ACM Press
Full text available: pdf(117.39 KB)   Additional Information: full citation, abstract, references, index terms

This paper proposes an MP3 watermarking method that is applicable to a mobile terminal with limited computational resources. Considering that the embedded information is copyright information and metadata, which should be extracted before playing back, the watermark detection process should be executed quickly. However, conventional methods cannot detect a digital watermark at high speed. Thus, this paper proposes that scalefactor values in MP3 data be altered so as not to spoil audio quality. E ...

Keywords: MP3, mobile terminal, scalefactor, watermarking

16 Content-adaptive digital music watermarking based on music structure analysis

Changsheng Xu, Namunu C. Maddage, Xi Shao, Qi Tian

February 2007 **ACM Transactions on Multimedia Computing, Communications, and Applications (TOMCCAP)**, Volume 3 Issue 1

Publisher: ACM Press

Full text available: pdf(583.99 KB)   Additional Information: full citation, abstract, references, index terms

A novel content-adaptive music watermarking technique is proposed in this article. To optimally balance inaudibility and robustness when embedding and extracting watermarks, the embedding scheme is highly related to the music structure and human auditory system (HAS). A note-based segmentation method is proposed and used for music vocal/instrumental boundary detection. A multiple bit hopping and hiding scheme with different embedding parameters is applied to vocal and instrumental frames of the ...

Keywords: Content-adaptive, digital watermarking, inaudibility, music structure, note-based segmentation, robustness

17 Robust digital watermarking: The digital watermarking container: secure and efficient embedding

Martin Steinebach, Sascha Zmudzinski, Fan Chen

September 2004 **Proceedings of the 2004 workshop on Multimedia and security MM&Sec '04**

Publisher: ACM Press

Full text available: pdf(357.96 KB)   Additional Information: full citation, abstract, references, citings, index terms

While acceptance of digital watermarking as a technology to protect digital media is constantly increasing, integrated applications are still comparatively rare. Two reasons are the challenge of secure key handling due to the symmetric nature of digital watermarking and the often high demand regarding computational power to embed a watermarking into a media file. We introduce a possible solution to this problem, the digital watermarking container. It splits the watermarking process in a preproce ...

Keywords: complexity, container, optimization, security, watermarking

18 Session S1: VR modeling: geometry and texture: A novel watermarking method based on Fibonacci numbers

Jiancheng Zou, Dongxu Qi, Rabab K. Ward

June 2006 **Proceedings of the 2006 ACM international conference on Virtual reality continuum and its applications VRCIA '06**

Publisher: ACM Press

Full text available: pdf(125.56 KB)   Additional Information: full citation, abstract, references, index terms

A digital image scrambling method based on the Fibonacci numbers is presented in [Zou J. et al. 2004]. A novel audio watermarking method based on Fibonacci numbers is given in this paper. The experiment results show that the algorithm has better robust than the traditional phase watermark algorithm. Based on the property of uniformity of the corresponding Fibonacci transformation, the watermarking method has the following advantages: (1) Encoding and decoding are very simple and they can be appl ...

Keywords: fibonacci numbers, watermarking

19 Multimedia issues in digital libraries: A quantified fidelity criterion for parameter-embedded watermarking of audio archives
A. R. Gurijala, J. R. Deller
May 2003 **Proceedings of the 3rd ACM/IEEE-CS joint conference on Digital libraries JCDL '03**
Publisher: IEEE Computer Society
Full text available: ▢ pdf(203.18 KB)   Additional Information: <u>full citation</u>, <u>abstract</u>, <u>references</u>, <u>index terms</u>

A novel algorithm for speech watermarking through parametric modeling is enhanced by inclusion of a quantified fidelity criterion. Watermarking is effected through solution of a set-membership filtering (SMF) problem, subject to an $l\infty$ fidelity criterion in the signal space. The SMF approach provides flexibility in obtaining watermark solutions that trade-off watermark robustness and stegosignal fidelity.

20 Security analysis II: Digital watermarking security considerations
Rade Petrovic, Babak Tehranchi, Joseph M. Winograd
September 2006 **Proceeding of the 8th workshop on Multimedia and security MM&Sec '06**
Publisher: ACM Press
Full text available: ▢ pdf(253.62 KB)   Additional Information: <u>full citation</u>, <u>abstract</u>, <u>references</u>, <u>index terms</u>

In this paper, we review our past experience with security of copy control audio watermarks, particularly related to SDMI. We also classify and analyze attacks published in literature and propose a number of security enhancement techniques for copy control and other digital watermarking applications. One type of security measure is based on uncoordinated selection of hiding places between embedders and extractors, with statistical analysis of expected matches. This approach reduces the repeatabi ...

Keywords: SDMI, copy control, digital rights management, digital watermarking, watermark attacks

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21 Opportunities for watermarking standards   ▭
     Fred Mintzer, Gordon W. Braudaway, Alan E. Bell
     July 1998 **Communications of the ACM**, Volume 41 Issue 7
     Publisher: ACM Press

     Full text available: 🗎 pdf(672.37 KB)   Additional Information: full citation, references, citings, index terms, review

22 Technical session 10: watermarking and multi-media processing: Fingerprinting and   ▭
     forensic analysis of multimedia
     Daniel Schonberg, Darko Kirovski
     October 2004 **Proceedings of the 12th annual ACM international conference on Multimedia MULTIMEDIA '04**
     Publisher: ACM Press

     Full text available: 🗎 pdf(1.24 MB)   Additional Information: full citation, abstract, references, citings, index terms

     One of the prime reasons movie and music studios have ignored the Internet for open-
     networked multimedia content delivery, has been the lack of a technology that can
     support a secure digital rights management (DRM) system on a general purpose
     computer. The difficulty of building an effective multimedia DRM stems from the fact that
     traditional cryptograic primitives such as encryption or scrambling do not protect audio or
     video signals once they are played in plain-text. This fact, commonly re ...

     Keywords: audio, collusion attack, fingerprinting, forensic analysis, video

23 Preserving, securing, and assessing digital libraries: Why watermark?: the copyright   ▭
     need for an engineering solution
     Michael Seadle, J. R. Deller, Aparna Gurijala
     July 2002 **Proceedings of the 2nd ACM/IEEE-CS joint conference on Digital libraries JCDL '02**
     Publisher: ACM Press

     Full text available: 🗎 pdf(142.88 KB)   Additional Information: full citation, abstract, references, index terms

     An important research component in the creation of the National Gallery of the Spoken
     Word (NGSW) is the development of watermarking technologies for the audio library. In
     this paper we argue that audio watermarking is a particularly desirable means of

intellectual property protection. There is evidence that the courts consider watermarks to be a legitimate form of copyright protection. Watermarking facilitates redress, and represents a form of copyright protection that universities can use with ...

Keywords: DMCA, copyright, watermarking

24 Biometrics, watermarking, IKE: Component-based digital watermarking of Chinese texts
Xingming Sun, Gang Luo, Huajun Huang
November 2004 **Proceedings of the 3rd international conference on Information security InfoSecu '04**
Publisher: ACM Press
Full text available: pdf(427.96 KB)   Additional Information: full citation, abstract, references, index terms

According to the types of the host media, digital watermarking may be classified mainly as image watermarking, video watermarking, audio watermarking, and text watermarking. The principle of the three watermarking research fields are similar in that they make use of the redundant information of their host media and the characteristics of human video system or human audio system. Unfortunately, text has no redundant information. Text watermarking techniques are totally different from them. And te ...

Keywords: chinese character, component, digital watermarking, mathematical expression, robust, text watermarking

25 Technical session 3: audio processing: Real-time background music monitoring based on content-based retrieval
Yoshiharu Suga, Naoko Kosugi, Masashi Morimoto
October 2004 **Proceedings of the 12th annual ACM international conference on Multimedia MULTIMEDIA '04**
Publisher: ACM Press
Full text available: pdf(3.16 MB)   Additional Information: full citation, abstract, references, index terms

In this paper, we describe music monitoring in TV broadcasting based on content-based retrieval. A part of audio signals is sequentially extracted from TV broadcasting as a retrieval key, and a music DB that stores a great number of musical pieces is retrieved by this key based on content-based retrieval, and a musical piece is identified sequentially. In this way, we are able to carry out music monitoring. There are three necessary requirements important for realization of the music monitori ...

Keywords: content-based retrieval, hashing, monitoring, music continuity, non-stationary noise, spectral peaks

26 A survey of RST invariant image watermarking algorithms
Dong Zheng, Yan Liu, Jiying Zhao, Abdulmotaleb El Saddik
July 2007 **ACM Computing Surveys (CSUR)**, Volume 39 Issue 2
Publisher: ACM Press
Full text available: pdf(5.53 MB)   Additional Information: full citation, abstract, references, index terms

In this article, we review the algorithms for rotation, scaling and translation (RST) invariant image watermarking. There are mainly two categories of RST invariant image watermarking algorithms. One is to rectify the RST transformed image before conducting watermark detection. Another is to embed and detect watermark in an RST invariant or semi-invariant domain. In order to help readers understand, we first introduce the fundamental theories and techniques used in the existing RST invariant ...

Keywords: Digital image watermarking, Fourier-Mellin transform, ILPM, LPM, RST invariant, Radon transform, feature points, moments, template matching

27 Posters: Copyright protection on the web: a hybrid digital video watermarking scheme

Pat Pik-Wah Chan, Michael R. Lyu, Roland T. Chin
May 2004 **Proceedings of the 13th international World Wide Web conference on Alternate track papers & posters WWW Alt. '04**
Publisher: ACM Press
Full text available: pdf(169.45 KB)   Additional Information: full citation, abstract, references, index terms

Video is one of the most popular data shared in the Web, and the protection of video copyright is of vast interest. In this paper, we present a comprehensive approach for protecting and managing video copyrights in the Internet with watermarking techniques. We propose a novel hybrid digital video watermarking scheme with scrambled watermarks and error correction codes. The effectiveness of this scheme is verified through a series of experiments, and the robustness of our approach is demonstrated ...

Keywords: digital watermarking, hybrid, scene change, video

28 A survey course on computer audio
Stephen V. Rice
June 2005 **Journal of Computing Sciences in Colleges**, Volume 20 Issue 6
Publisher: Consortium for Computing Sciences in Colleges
Full text available: pdf(127.98 KB)   Additional Information: full citation, abstract, references, index terms

A new one-semester course for graduate students introduces them to the field of computer audio from a computer science perspective. Students gain an understanding of sound, speech, and music and their digital representation and processing in computer software. Programming assignments provide hands-on experience in playing, recording, mixing, synthesizing, and analyzing audio. Class lectures present algorithms and techniques for compression, watermarking, synthesis, sonification, pitch and beat d ...

29 Robust mesh watermarking
Emil Praun, Hugues Hoppe, Adam Finkelstein
July 1999 **Proceedings of the 26th annual conference on Computer graphics and interactive techniques SIGGRAPH '99**
Publisher: ACM Press/Addison-Wesley Publishing Co.
Full text available: pdf(2.08 MB)   Additional Information: full citation, references, citings, index terms

Keywords: copyright protection, steganography

30 Digital multimedia book: From digital audiobook to secure digital multimedia-book
Lavinia Egidi, Marco Furini
July 2006 **Computers in Entertainment (CIE)**, Volume 4 Issue 3
Publisher: ACM Press
Full text available: pdf(364.18 KB)   Additional Information: full citation, abstract, references, index terms

Portable devices and wireless connections are creating a new scenario in which digital information is entering our lives in a massive way. In this article we consider MP3 audiobook applications and propose an approach to completely restyle the applications to the current mobile and multimedia scenario. Our mechanism introduces multimedia

contents (images and text) into the audiobook application and synchronizes them with the MP3 audio stream. Multimedia contents are protected by a security syste ...

Keywords: multimedia applications, multimedia communications, multimedia over wireless, music distribution

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31 Authentication and forensics: Digital audio forensics: a first practical evaluation on microphone and environment classification
Christian Kraetzer, Andrea Oermann, Jana Dittmann, Andreas Lang
September 2007 **Proceedings of the 9th workshop on Multimedia & security MM&Sec '07**
Publisher: ACM Press
Full text available: pdf(394.79 KB)   Additional Information: full citation, abstract, references, index terms

In this paper a first approach for digital media forensics is presented to determine the used microphones and the environments of recorded digital audio samples by using known audio steganalysis features. Our first evaluation is based on a limited exemplary test set of 10 different audio reference signals recorded as mono audio data by four microphones in 10 different rooms with 44.1 kHz sampling rate and 16 bit quantisation. Note that, of course, a generalisation of the results cannot be ach ...

Keywords: digital media forensics, multimedia authentication

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32 Multimedia and Visualization (MV): A robust watermarking system based on *SVD* compression
Maria Calagna, Huiping Guo, Luigi V. Mancini, Sushil Jajodia
April 2006 **Proceedings of the 2006 ACM symposium on Applied computing SAC '06**
Publisher: ACM Press
Full text available: pdf(871.94 KB)   Additional Information: full citation, abstract, references, index terms

Digital watermarking can be used to protect the intellectual property for multimedia data. In this paper, we introduce an image watermarking scheme based on the SVD (*Singular Value Decomposition*) compression. In particular, we divide the cover image into blocks and apply the SVD to each block; the watermark is embedded in all the non-zero singular values according to the local features of the cover image so as to balance embedding capacity with distortion. The watermarking system we propo ...

Keywords: digital watermarking, image compression, singular value decomposition

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33 Power optimization for real-time and media-rich embedded systems: Proxy-based task partitioning of watermarking algorithms for reducing energy consumption in mobile devices
Arun Kejariwal, Sumit Gupta, Alexandru Nicolau, Nikil Dutt, Rajesh Gupta
June 2004 **Proceedings of the 41st annual conference on Design automation DAC '04**
Publisher: ACM Press
Full text available: pdf(494.20 KB)   Additional Information: full citation, abstract, references, index terms

Digital watermarking is a process that embeds an imperceptible signature or watermark in a digital file containing audio, image, text or video data. The watermark is later used to authenticate the data file and for tamper detection. It is particularly valuable in the use and exchange of digital media such as audio and video on emerging handheld devices. However, watermarking is computationally expensive and adds to the drain of the available energy in handheld devices. We present an approach in ...

Keywords: handhelds, partitioning, proxy, watermarking

34 Audio watermarking techniques for the National Gallery of the Spoken Word

J. R. Deller, Aparna Gurijala, Michael S. Seadle

January 2001 **Proceedings of the 1st ACM/IEEE-CS joint conference on Digital libraries JCDL '01**

Publisher: ACM Press

Full text available: pdf(173.80 KB)   Additional Information: full citation, abstract, references, citings, index terms

This is one of two companion papers describing technical challenges faced in the development of the National Gallery of the Spoken Word (NGSW). The present paper describes watermarking technologies for intellectual property protection. Following an introduction to data watermarking, the paper focuses on a new algorithm called \textit{transform encryption coding} (TEC) and its application to watermarking the NGSW archives. TEC has a number of flexible features that make it amenable to ...

35 Multimedia content protection by cryptography and watermarking in tamper-resistant hardware

Feng Bao

November 2000 **Proceedings of the 2000 ACM workshops on Multimedia MULTIMEDIA '00**

Publisher: ACM Press

Full text available: pdf(386.63 KB)   Additional Information: full citation, abstract, references, citings, index terms

With the rapid growth of broadband network, distribution of multimedia via Internet is a must way to go. Content protection has become one of the most significant and challenging problems of this field. In this paper, we propose a general scheme that combines public key cryptography and watermarking technology together, to achieve wonderful content protection. The scheme is reliable, flexible and efficient.

Keywords: multimedia content protection, public key cryptography, tamper-resistant hardware, watermarking technology

36 Watermarking relational databases

Rakesh Agrawal, Jerry Kiernan

August 2002 **Proceedings of the 28th international conference on Very Large Data Bases - Volume 28 VLDB '2002**

Publisher: VLDB Endowment

Full text available: pdf(208.56 KB)   Additional Information: full citation, abstract, references, index terms

We enunciate the need for watermarking database relations to deter their piracy, identify the unique characteristics of relational data which pose new challenges for watermarking, and provide desirable properties of a watermarking system for relational data. A watermark can be applied to any database relation having attributes which are such that changes in a few of their values do not affect the applications.

We then present an effective watermarking technique geared for relational da ...

37

Digital rights management and watermarking: An attack-localizing watermarking

scheme for natural language documents
Gaurav Gupta, Josef Pieprzyk, Hua Xiong Wang
March 2006 **Proceedings of the 2006 ACM Symposium on Information, computer and communications security ASIACCS '06**
Publisher: ACM Press
Full text available: pdf(390.28 KB)   Additional Information: full citation, abstract, references, index terms

We present a text watermarking scheme that embeds a bitstream watermark *Wi* in a text document *P* preserving the meaning, context, and flow of the document. The document is viewed as a set of paragraphs, each paragraph being a set of sentences. The sequence of paragraphs and sentences used to embed watermark bits is permuted using a secret key. Then, English language sentence transformations are used to modify sentence lengths, thus embedding watermarking bits in the Least ...

Keywords: copyright, permutation, watermarking

38 Special issue on independent components analysis: ICA for watermarking digital images
Stéphane Bounkong, Borémi Toch, David Saad, David Lowe
December 2003 **The Journal of Machine Learning Research**, Volume 4
Publisher: MIT Press
Full text available: pdf(554.76 KB)   Additional Information: full citation, abstract, citings, index terms

We present a domain-independent ICA-based approach to watermarking. This approach can be used on images, music or video to embed either a robust or fragile watermark.In the case of robust watermarking, the method shows high information rate and robustness against malicious and non-malicious attacks, while keeping a low induced distortion. The fragile watermarking scheme, on the other hand, shows high sensitivity to tampering attempts while keeping the requirement for high information rate and lo ...

39 Session 7: content watermarking: Multimedia content screening using a dual watermarking and fingerprinting system
Darko Kirovski, Henrique Malvar, Yacov Yacobi
December 2002 **Proceedings of the tenth ACM international conference on Multimedia MULTIMEDIA '02**
Publisher: ACM Press
Full text available: pdf(262.42 KB)   Additional Information: full citation, abstract, references, citings

We present a new dual watermarking and fingerprinting system, where initially all copies of a protected object are identically watermarked using a secret key, but individual detection keys are distinct. By knowing a detection key, an adversary cannot recreate the original content from the watermarked content. However, knowledge of any one detection key is sufficient for modifying the object so that a detector using that key would fail to detect the marks. Detectors using other detection keys wou ...

40 RFID & watermarking: A blind, fast and robust method for geographical data watermarking
Cyril Bazin, Jean-Marie Le Bars, Jacques Madelaine
March 2007 **Proceedings of the 2nd ACM symposium on Information, computer and communications security ASIACCS '07**
Publisher: ACM Press
Full text available: pdf(4.47 MB)   Additional Information: full citation, abstract, references

The aim of this paper is to propose an efficient digital water-marking algorithm on geographical data. Our algorithm is fast, blind and robust. Thus, the original data is not needed in order to prove the authorship of the document and the watermark is resiliant

against many transformations applied on the document.

The method we propose is based on a modification of parts of the data selected upon local criterias and a secret key. The local criterias use topological properties of a Dela ...

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Terms used: **mp3** and **watermark**   Found **1,045** of **214,158**

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1 Poster 3: content track: Light weight MP3 watermarking method for mobile terminals ◪

Koichi Takagi, Shigeyuki Sakazawa
November 2005 **Proceedings of the 13th annual ACM international conference on Multimedia MULTIMEDIA '05**
Publisher: ACM Press
Full text available: 🗎 pdf(117.39 KB)   Additional Information: full citation, abstract, references, index terms

This paper proposes an MP3 watermarking method that is applicable to a mobile terminal with limited computational resources. Considering that the embedded information is copyright information and metadata, which should be extracted before playing back, the watermark detection process should be executed quickly. However, conventional methods cannot detect a digital watermark at high speed. Thus, this paper proposes that scalefactor values in MP3 data be altered so as not to spoil audio quality. E ...

Keywords: MP3, mobile terminal, scalefactor, watermarking

2 Digital watermarking approaches I: A compressed-domain watermarking algorithm for ■ mpeg audio layer 3

D. K. Koukopoulos, Y. C. Stamatiou
October 2001 **Proceedings of the 2001 workshop on Multimedia and security: new challenges MM&Sec '01**
Publisher: ACM Press
Full text available: 🗎 pdf(483.56 KB)   Additional Information: full citation, abstract, references

In this work, we present a digital watermarking scheme for mpeg audio layer 3 audio files that operates directly in the compressed data while manipulating the time and subband/channel domain. In addition, it does not need the original signal to detect the watermark. Our scheme overcomes the disadvantage of algorithms operating in the PCM-Data domain to be vulnerable to compression/recompression attacks, as it places the watermark in the scale factors domain and not in the digitized sound audi ...

Keywords: NP-completeness, audio watermarking, hard instances, mpeg audio layer 3, threshold phenomena

3 Robust digital watermarking: The digital watermarking container: secure and efficient ■ embedding

Martin Steinebach, Sascha Zmudzinski, Fan Chen
September 2004 **Proceedings of the 2004 workshop on Multimedia and security MM&Sec '04**
Publisher: ACM Press

Full text available: pdf(357.96 KB)   Additional Information: <u>full citation</u>, <u>abstract</u>, <u>references</u>, <u>citings</u>, <u>index terms</u>

While acceptance of digital watermarking as a technology to protect digital media is constantly increasing, integrated applications are still comparatively rare. Two reasons are the challenge of secure key handling due to the symmetric nature of digital watermarking and the often high demand regarding computational power to embed a watermarking into a media file. We introduce a possible solution to this problem, the digital watermarking container. It splits the watermarking process in a preproce ...

Keywords: complexity, container, optimization, security, watermarking

4   Digital multimedia book: From digital audiobook to secure digital multimedia-book
Lavinia Egidi, Marco Furini
July 2006 **Computers in Entertainment (CIE)**, Volume 4 Issue 3
Publisher: ACM Press

Full text available: pdf(364.18 KB)   Additional Information: <u>full citation</u>, <u>abstract</u>, <u>references</u>, <u>index terms</u>

Portable devices and wireless connections are creating a new scenario in which digital information is entering our lives in a massive way. In this article we consider MP3 audiobook applications and propose an approach to completely restyle the applications to the current mobile and multimedia scenario. Our mechanism introduces multimedia contents (images and text) into the audiobook application and synchronizes them with the MP3 audio stream. Multimedia contents are protected by a security syste ...

Keywords: multimedia applications, multimedia communications, multimedia over wireless, music distribution

5   Watermarking algorithms: Informed detection of audio watermark for resolving playback speed modifications
Sylvain Beauget, Michiel van der Veen, Aweke Lemma
September 2004 **Proceedings of the 2004 workshop on Multimedia and security MM&Sec '04**
Publisher: ACM Press

Full text available: pdf(388.24 KB)   Additional Information: <u>full citation</u>, <u>abstract</u>, <u>references</u>

In this paper, we present a method for informed watermark detection in audio signals. In this context, informed detection refers to the mechanism in which the original media signal is used to improve robustness and/or complexity. Here, we focused on reducing complexity by addressing the geometrical distortion problem. In audio, geometrical distortion translates to time scaling. Generally, s speed changes of the audio signals necessitate a mechanism in the detector to retrieve the watermark. Usua ...

Keywords: audio, fingerprinting, informed detector, music distribution, watermarking

6   Session S1: VR modeling: geometry and texture: A novel watermarking method based on Fibonacci numbers
Jiancheng Zou, Dongxu Qi, Rabab K. Ward
June 2006 **Proceedings of the 2006 ACM international conference on Virtual reality continuum and its applications VRCIA '06**

Publisher: ACM Press

Full text available: pdf(125.56 KB)   Additional Information: full citation, abstract, references, index terms

> A digital image scrambling method based on the Fibonacci numbers is presented in [Zou J. et al. 2004]. A novel audio watermarking method based on Fibonacci numbers is given in this paper. The experiment results show that the algorithm has better robust than the traditional phase watermark algorithm. Based on the property of uniformity of the corresponding Fibonacci transformation, the watermarking method has the following advantages: (1) Encoding and decoding are very simple and they can be appl ...

> **Keywords:** fibonacci numbers, watermarking

7 Watermarking: Improved watermark detection for spread-spectrum based watermarking using independent component analysis

Hafiz Malik, Ashfaq Khokhar, Rashid Ansari

November 2005 **Proceedings of the 5th ACM workshop on Digital rights management DRM '05**

Publisher: ACM Press

Full text available: pdf(434.70 KB)   Additional Information: full citation, abstract, references, index terms

> This paper presents an efficient blind watermark detection/decoding scheme for spread spectrum (SS) based watermarking, exploiting the fact that in SS-based embedding schemes the embedded watermark and the host signal are mutually independent and obey non-Gaussian distribution. The proposed scheme employs the theory of independent component analysis (ICA) and posed the watermark detection as a blind source separation problem. The proposed ICA-based blind detection/decoding scheme has been simula ...

> **Keywords:** blind source separation, correlation, detection, independent component analysis, spread spectrum, watermarking

8 Biometrics, watermarking, IKE: A new content-based digital audio watermarking algorithm for copyright protection

Xiang-yang Wang, Yong-rui Cui, Hong-ying Yang, Hong Zhao

November 2004 **Proceedings of the 3rd international conference on Information security InfoSecu '04**

Publisher: ACM Press

Full text available: pdf(563.54 KB)   Additional Information: full citation, abstract, references, index terms

> Digital audio watermarking embeds inaudible information into digital audio data for the purposes of copyright protection, ownership verification, convert communication, and/or auxiliary data carrying. In this paper, we present a novel watermarking scheme to embed a meaningful gray image into digital audio by quantizing the wavelet coefficients (using integer lifting wavelet transform) of audio samples. Our audio-dependent watermarking procedure directly exploits temporal and frequency perceptual ...

> **Keywords:** digital audio, digital watermarking, human auditory system, integer lifting wavelet transform, quantization

9 Preserving, securing, and assessing digital libraries: Why watermark?: the copyright need for an engineering solution

Michael Seadle, J. R. Deller, Aparna Gurijala

July 2002 **Proceedings of the 2nd ACM/IEEE-CS joint conference on Digital libraries JCDL '02**

Publisher: ACM Press

Full text available: 🗋 pdf(142.88 KB)   Additional Information: <u>full citation</u>, <u>abstract</u>, <u>references</u>, <u>index terms</u>

> An important research component in the creation of the National Gallery of the Spoken Word (NGSW) is the development of watermarking technologies for the audio library. In this paper we argue that audio watermarking is a particularly desirable means of intellectual property protection. There is evidence that the courts consider watermarks to be a legitimate form of copyright protection. Watermarking facilitates redress, and represents a form of copyright protection that universities can use with ...

> **Keywords:** DMCA, copyright, watermarking

10 <u>Steganography I: Statistical characterisation of MP3 encoders for steganalysis</u> ■

Rainer Böhme, Andreas Westfeld

September 2004 **Proceedings of the 2004 workshop on Multimedia and security MM&Sec '04**

Publisher: ACM Press

Full text available: 🗋 pdf(254.36 KB)   Additional Information: <u>full citation</u>, <u>abstract</u>, <u>references</u>, <u>index terms</u>

> This paper outlines a strategy to discriminate different ISO/MPEG 1 Audio Layer-3 (MP3) encoding programs by statistical particularities of the compressed audio streams. We use Bayesian logic to deduce the most probable encoder on the basis of a feature vector that can be extracted from arbitrary MP3 files. All appropriate features used for the classification are discussed and example results for sets of test data from 20 different codecs are given. Possible applications include advances in info ...

> **Keywords:** MP3 encoder classification, digital forensics, steganalysis

11 <u>Audio watermarking for monitoring and copy protection</u> ■

Jaap Haitsma, Michiel van der Veen, Ton Kalker, Fons Bruekers

November 2000 **Proceedings of the 2000 ACM workshops on Multimedia MULTIMEDIA '00**

Publisher: ACM Press

Full text available: 🗋 pdf(313.49 KB)   Additional Information: <u>full citation</u>, <u>abstract</u>, <u>references</u>, <u>citings</u>, <u>index terms</u>

> Based on existing technology used in image and video watermarking, we have developed a robust audio watermarking technique. The embedding algorithm operates in frequency ʾdomain, where the magnitudes of the Fourier coefficients are slightly modified. In the temporal domain, an additional scale parameter and gain function are necessary to refine the watermark and achieve perceptual transparency. Watermark detection relies on the Symmetrical Phase Only Matched Filtering (SPOMF) cross-correlation ...

> **Keywords:** audio, broadcast monitoring, copy protection, watermark detection, watermark embedding

12 <u>Benchmarking and attacks: Transparency and complexity benchmarking of audio watermarking algorithms issues</u> ■

Andreas Lang, Jana Dittmann

September 2006 **Proceeding of the 8th workshop on Multimedia and security MM&Sec '06**

Publisher: ACM Press

Full text available: 🗋 pdf(336.26 KB)   Additional Information: <u>full citation</u>, <u>abstract</u>, <u>references</u>, <u>index terms</u>

> A wide range of watermarking evaluation techniques especially for robustness has been

described in the literature. Our paper sets the main focus on the evaluation of transparency and complexity of the embedding function of digital audio watermarking algorithms. Here, beside the evaluation of embedding parameters and the impact of audio content are investigated to determine the effects of transparency and complexity. The five selected watermarking algorithms, working in different domains, the emb ...

Keywords: audio, benchmarking, evaluation, watermarking

13 A robust blind watermarking scheme based on distributed source coding principles

Jim Chou, Sandeep Pradhan, Kannan Ramchandran

October 2000 **Proceedings of the eighth ACM international conference on Multimedia MULTIMEDIA '00**

Publisher: ACM Press

Full text available: pdf(835.98 KB)   Additional Information: full citation, abstract, references, index terms

We propose a powerful new solution to the multimedia watermarking problem by exploiting its duality with another problem for which we have recently made pioneering constructive contributions. This latter problem is that of distributed source coding, or compression of correlated sources that are distributed. We show how these two seemingly unrelated problems are actually duals of each other. We exploit this duality by transforming our recently introduced powerful constructive framework for the ...

Keywords: data hiding, digital watermarking, multimedia security

14 The Internet is changing the music industry

August 2001 **Communications of the ACM**, Volume 44 Issue 8

Publisher: ACM Press

Full text available: pdf(100.53 KB)   Additional Information: full citation, references, citings, index terms,
                  html(34.37 KB)   review

15 Applications I: PlataJanus: an audio annotation watermarking framework

Jana Dittmann, Martin Steinebach

October 2001 **Proceedings of the 2001 workshop on Multimedia and security: new challenges MM&Sec '01**

Publisher: ACM Press

Full text available: pdf(545.27 KB)   Additional Information: full citation, abstract, references, index terms

The focus of audio watermarking research in recent years have been copyright protection and copy control mechanisms. Therefore the robustness and security of audio watermarks have been the most frequently discussed parameters. Transparency, payload and complexity have also been important, but most research has focused on the first two parameters. In this paper, we introduce an alternative watermarking application. PlataJanus is a system for displaying and reacting on digital annotation waterm ...

Keywords: annotation, audio watermarking, business models, framework

16 Digital watermarking approaches II: Watermarking techniques using the Drawing Exchange Format (DXF) file

Hwan II Kang, Kab II Kim, Seung-Soo Han

October 2001 **Proceedings of the 2001 workshop on Multimedia and security: new challenges MM&Sec '01**

Publisher: ACM Press
Full text available: pdf(294.19 KB)   Additional Information: full citation, abstract, references, index terms

> This paper presents an algorithm of the watermark insertion and extraction on the vector image. Most parts of the vector image consist of the array of the coordinate values. The vector watermarking method by Sakamoto et al [1] uses the mask within which all the coordinate values of all the vertices are changed depending on the value of the watermark. The proposed algorithm is the change of the vector image file instead of the change of the coordinate values on the vector image. We use the Dra ...

> **Keywords:** Drawing Exchange Format File (DXFF), vector image, watermarking

17 New products
Linux Journal Staff
May 2007 **Linux Journal**, Volume 2007 Issue 157
Publisher: Specialized Systems Consultants, Inc.
Full text available: html(20.88 KB) Additional Information: full citation, index terms

18 Introduction to the ACM multimedia and security workshop
Jana Dittmann, Jessica Fridrich
September 2004 **Proceedings of the 2004 workshop on Multimedia and security MM&Sec '04**
Publisher: ACM Press
Full text available: pdf(153.53 KB)   Additional Information: full citation, references

19 Coimbra: secure Web access to multimedia content
Edgar Weippl
November 2000 **Proceedings of the 2000 ACM workshops on Multimedia MULTIMEDIA '00**
Publisher: ACM Press
Full text available: pdf(577.14 KB)   Additional Information: full citation, abstract, references, index terms

> In this paper, we describe various concepts how Web content can be published in a way so that copies cannot be illegally distributed. The required access control mechanisms are implemented using well-known cryptographic algorithms. A modified Web browser decrypts the content on-the-fly so that it is impossible for unauthorized users to copy and distribute the presented multimedia content.

> **Keywords:** confidentiality, discretionary access control, encryption, security model

20 Steganography may increase learning everywhere
James Ryder
May 2004 **Journal of Computing Sciences in Colleges**, Volume 19 Issue 5
Publisher: Consortium for Computing Sciences in Colleges
Full text available: pdf(302.98 KB)   Additional Information: full citation, abstract, references

> In this paper, we describe an interesting and contemporary topic called steganography and ways that it can easily be included in computer science courses. Today, steganography is used in many ways. By discussing and demonstrating steganography,

an instructor can show interesting examples, ranging from simple to complex, of how computer science is found in commercial, military, and private software applications. Our results, although strictly casual, suggest that steganography, and its applicatio ...

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21 Applications II: The hiding virtues of ambiguity: quantifiably resilient watermarking of   ■
natural language text through synonym substitutions
Umut Topkara, Mercan Topkara, Mikhail J. Atallah
September 2006 **Proceeding of the 8th workshop on Multimedia and security MM&Sec '06**
Publisher: ACM Press

Full text available: 🗎 pdf(306.51 KB)   Additional Information: full citation, abstract, references, cited by, index terms

Information-hiding in natural language text has mainly consisted of carrying out
approximately meaning-preserving modifications on the given cover text until it encodes
the intended mark. A major technique for doing so has been synonym-substitution. In
these previous schemes, synonym substitutions were done until the text "confessed", i.e.,
carried the intended mark message. We propose here a better way to use synonym
substitution, one that is no longer entirely guided by the mark-insertion proc ...

Keywords: homograph, information hiding, natural language text, synonym substitution

22 Implementing encrypted streaming video in a distributed server environment   ■
Jason But, Grenville Armitage
June 2005 **Proceedings of the 2005 ACM SIGCHI International Conference on
Advances in computer entertainment technology ACE '05**
Publisher: ACM Press
Full text available: 🗎 pdf(221.97 KB)   Additional Information: full citation, abstract, references, index terms

Technical issues are not the only ones preventing large scale introduction of online
streaming video services. Unlike generic web browsing applications, streaming video
imposes greater demands on network resources. Caching of content through the use of
distributed servers has been proposed as a solution to reduce resource requirements and
improve scalability. Video caching presents a unique challenge to copyright protection
schemes, particularly if we consider provision of functionality such as ...

Keywords: copyright protection, streaming video, video encryption

23   ■
Multimedia copyright enforcement on the Internet (panel session)
James M. Burger, Christopher J. Cookson, Darko Kirovski, David P. Maher, Miodrag

Potkonjak, Jeremy Welt
October 2000 **Proceedings of the eighth ACM international conference on Multimedia MULTIMEDIA '00**
Publisher: ACM Press
Full text available: pdf(175.77 KB)   Additional Information: full citation, abstract, index terms

Keywords: MP3, copyright, digital media, digital rights management, intellectual property protection

24 Business: the 8th layer: The chalice from the palace
Esther Schindler
June 2004 **netWorker**, Volume 8 Issue 2
Publisher: ACM Press
Full text available: pdf(154.65 KB)
html(13.60 KB)   Additional Information: full citation, abstract, index terms

Steganography lets you embed one kind of data---a file or watermark---inside another form of digital media. Its most obvious uses are in security and intellectual property protection, but that may be only the beginning.

25 Introduction
Jeremy T. Lanman
April 2004 **Crossroads**, Volume 10 Issue 3
Publisher: ACM Press
Full text available: htm(7.69 KB)   Additional Information: full citation, references, index terms

26 A survey course on computer audio
Stephen V. Rice
June 2005 **Journal of Computing Sciences in Colleges**, Volume 20 Issue 6
Publisher: Consortium for Computing Sciences in Colleges
Full text available: pdf(127.98 KB)   Additional Information: full citation, abstract, references, index terms

A new one-semester course for graduate students introduces them to the field of computer audio from a computer science perspective. Students gain an understanding of sound, speech, and music and their digital representation and processing in computer software. Programming assignments provide hands-on experience in playing, recording, mixing, synthesizing, and analyzing audio. Class lectures present algorithms and techniques for compression, watermarking, synthesis, sonification, pitch and beat d ...

27 Innovation, management & strategy: Towards a framework for understanding the effectiveness of digital content exploitation strategies
Ernst-Jan Goedvolk, Edward Faber, René W. Wagenaar
March 2004 **Proceedings of the 6th international conference on Electronic commerce ICEC '04**
Publisher: ACM Press
Full text available: pdf(259.74 KB)   Additional Information: full citation, abstract, references, index terms

Due to initiatives like Napster and Kazaa the business case for delivering protected digital content remains problematic. Still little is known about the effectiveness of content exploitation strategies. In this paper the literature on content protection, provisioning and usage is reviewed. Based on this review a causal framework is developed, which seeks to explain the effectiveness of content exploitation strategies. The paper ends with

formulating a research agenda for studying content exploi ...

Keywords: content exploitation, content protection

28 The UCON$_{ABC}$ usage control model

Jaehong Park, Ravi Sandhu
February 2004 **ACM Transactions on Information and System Security (TISSEC)**, Volume 7 Issue 1
Publisher: ACM Press

Full text available: pdf(518.61 KB)   Additional Information: <u>full citation</u>, <u>abstract</u>, <u>references</u>, <u>citings</u>, <u>index terms</u>

In this paper, we introduce the family of UCON$_{ABC}$ models for usage control (UCON), which integrate *Authorizations (A), oBligations (B), and Conditions (C)*. We call these core models because they address the essence of UCON, leaving administration, delegation, and other important but second-order issues for later work. The term usage control is a generalization of access control to cover authorizations, obligations, conditions, continuity (ongoing controls), and mutability. Trad ...

Keywords: access control, digital rights management, privacy, trust, usage control

29 Digital rights management for content distribution

Qiong Liu, Reihaneh Safavi-Naini, Nicholas Paul Sheppard
January 2003 **Proceedings of the Australasian information security workshop conference on ACSW frontiers 2003 - Volume 21 ACSW Frontiers '03**
Publisher: Australian Computer Society, Inc.

Full text available: pdf(224.63 KB)   Additional Information: <u>full citation</u>, <u>abstract</u>, <u>references</u>, <u>citings</u>, <u>index terms</u>

Transferring the traditional business model for selling digital goods linked to physical media to the online world leads to the need for a system to protect digital intellectual property. Digital Rights Management(DRM) is a system to protect high-value digital assets and control the distribution and usage of those digital assets. This paper presents a review of the current state of DRM, focusing on security technologies, underlying legal implications and main obstacles to DRM deployment with the ...

Keywords: DRM, digital content

30 Comparing the usage of digital rights management systems in the music, film, and print industry

Marc Fetscherin, Matthias Schmid
September 2003 **Proceedings of the 5th international conference on Electronic commerce ICEC '03**
Publisher: ACM Press

Full text available: pdf(212.60 KB)   Additional Information: <u>full citation</u>, <u>abstract</u>, <u>references</u>, <u>index terms</u>

The business of content providers is being threatened by technology advances in hardware, software and IP-networks such as the Internet or peer-to-peer file sharing systems. The result is an increasing amount of illegal copies available on-line as well as off-line.With the emergence of Digital Rights Management Systems (DRMS), the media and entertainment industry seems to have found the appropriate tool to simultaneously fight piracy and to monetize their assets. Although these systems are very ...

Keywords: digital content, digital content distribution, digital rights management, piracy,

protection technologies

31 Understanding the shape of Java software

Gareth Baxter, Marcus Frean, James Noble, Mark Rickerby, Hayden Smith, Matt Visser, Hayden Melton, Ewan Tempero

October 2006 **ACM SIGPLAN Notices , Proceedings of the 21st annual ACM SIGPLAN conference on Object-oriented programming systems, languages, and applications OOPSLA '06**, Volume 41 Issue 10

Publisher: ACM Press

Full text available: pdf(453.19 KB)   Additional Information: full citation, abstract, references, index terms

Large amounts of Java software have been written since the language's escape into unsuspecting software ecology more than ten years ago. Surprisingly little is known about the structure of Java programs in the wild: about the way methods are grouped into classes and then into packages, the way packages relate to each other, or the way inheritance and composition are used to put these programs together. We present the results of the first in-depth study of the structure of Java programs. We have ...

Keywords: Java, object-oriented design, power-law distributions

32 Video portals for the next century (panel session)

Rob Koenen, Heather Yu, Avideh Zakhor, Francis Galliano, Charles Bouman

October 1999 **Proceedings of the seventh ACM international conference on Multimedia (Part 1) MULTIMEDIA '99**

Publisher: ACM Press

Full text available: pdf(660.29 KB)   Additional Information: full citation, index terms

33 Web accessibility: Improving the accessibility of aurally rendered HTML tables

Robert Filepp, James Challenger, Daniela Rosu

July 2002 **Proceedings of the fifth international ACM conference on Assistive technologies Assets '02**

Publisher: ACM Press

Full text available: pdf(1.36 MB)   Additional Information: full citation, abstract, references, citings, index terms

Current techniques employed to aurally render HTML tables often result in output that is very difficult for sight-impaired users to understand. This paper proposes TTPML, an XML-compliant markup language, which facilitates the generation of prose descriptions of tabular information. The markup language enables content creators to specify contextual reinforcement of, and linear navigation through, tabular information. The markup language may be applied to pre-existing Web content and is reusable ...

Keywords: Web accessibility, XML, aural interfaces, tables

34 Forum: Forum

Diane Crawford

September 2003 **Communications of the ACM**, Volume 46 Issue 9

Publisher: ACM Press

Full text available: pdf(74.45 KB)
html(12.12 KB)   Additional Information: full citation, index terms

35 Virtual extension: The economics of digital bundling: the impact of digitization and
bundling on the music industry
Kevin Zhu, Bryan MacQuarrie
September 2003 **Communications of the ACM**, Volume 46 Issue 9
Publisher: ACM Press
Full text available: pdf(170.60 KB)   Additional Information: full citation, appendices and supplements,
                         html(25.47 KB)   references, index terms

36 Language and Implementation: A heap de/compression module for wireless Java
Mayumi Kato, Chia-Tien Dan Lo
June 2004 **Proceedings of the 3rd international symposium on Principles and practice
            of programming in Java PPPJ '04**
Publisher: Trinity College Dublin
Full text available: pdf(918.31 KB)   Additional Information: full citation, abstract, references

> Cellular phones used to provide voice-only services, offline computing, games, schedulers,
> notes, and calculators, etc. Current generation of multi-functioned handsets including
> cellular phones and PDAs support high speed multimedia data transfers, MP3 music and
> video, and give the user direct access to multi-information services such as share process,
> news, sports results and M-commerce by Wireless Java. Many of these applications
> require a large volume of data and thus higher non-volatile memo ...

37 Alternate distribution strategies for digital music
G. Prem Premkumar
September 2003 **Communications of the ACM**, Volume 46 Issue 9
Publisher: ACM Press

Full text available: pdf(103.58 KB)   Additional Information: full citation, appendices and supplements,
                                                               abstract, references, cited by, index terms

> Digitization of music has created opportunities to reengineer the supply chain and
> improve its efficiency.

But how will it play out?

38 DRM experience: Digital rights management in a 3G mobile phone and beyond
Thomas S. Messerges, Ezzat A. Dabbish
October 2003 **Proceedings of the 3rd ACM workshop on Digital rights management
            DRM '03**
Publisher: ACM Press

Full text available: pdf(306.59 KB)   Additional Information: full citation, abstract, references, citings, index
                                                               terms

> In this paper we examine how copyright protection of digital items can be securely
> managed in a 3G mobile phone and other devices. First, the basic concepts, strategies,
> and requirements for digital rights management are reviewed. Next, a framework for
> protecting digital content in the embedded environment of a mobile phone is proposed
> and the elements in this system are defined. The means to enforce security in this system
> are described and a novel "Family Domain" approach to content management ...
>
> **Keywords**: MPEG-21, copyright protection, cryptography, digital content, digital rights
> management, embedded system, key management, mobile phone, open mobile alliance,
> security

39
Keynotes: Digital copyright and the progress of science

Jessica Litman
September 2002 **ACM SIGIR Forum**, Volume 36 Issue 2
Publisher: ACM Press
Full text available: pdf(60.91 KB)   Additional Information: full citation

40 Digital rights (and wrongs)
Dennis Fowler
June 2002 **netWorker**, Volume 6 Issue 2
Publisher: ACM Press
Full text available: pdf(68.75 KB)
                html(19.78 KB)   Additional Information: full citation, abstract, index terms

New legislation intended to resolve intellectual property issues only puts opposing
viewpoints in stark relief

Results 21 - 40 of 200   Result page: previous 1 **2** 3 4 5 6 7 8 9 10 next